Claims

1. In a method of producing cement clinker and electricity, comprising feeding cement raw mix and hydrocarbon in a circulating fluidized bed (1), calcining the cement raw mix in the circulating fluidized bed and producing steam therein, discharging hot bed material in a rotary kiln (16), clinkering the calcined material in the rotary kiln and subsequently cooling the clinker, further comprising the gas and the solids out of the fluidized bed entering a cyclone (8), the solids being separated therein being returned to the bed, whereby part of those solids being first cooled down in a solids heat exchanger (9) producing steam, whereas the gas and the fly ash escaping the cyclone being passed through at least one heat exchanger (28, 33) and through a filter (37), further comprising the produced steam being fed to a steam turbine island (42) comprising a steam turbine being drivingly connected to a generator,
the improvement comprising
- feeding part of the cement raw mix in pulverized form,
- designing the cyclone system so as the lime-rich fly ash obtained from calcination of limestone from the pulverized part of the cement raw mix escapes the cyclone system,
- feeding the predominant part of the remaining part of the cement raw mix in crushed form for forming bed and circulating material,
- and grinding the hot bed material as well as additives before blending them with lime being separated in the filter, separated in the filter, obtained from calcination of limestone in the cement raw mix.

2. A process according to claim 1, wherein the discharged hot bed material is cooled before grinding.

3. A process according to claim 1, wherein the calcined pulverized lime escaped from cyclone (8) and separated in filter (37) is supplied to the clinkering process.

4. A process according to claim 1, wherein carbon contained in the fly ash escaped from cyclone (8) and separated in filter (37) and the carbon added via discharged hot bed material (11) is supplied to the clinkering process as a fuel.

5. A process according to claim 4, wherein the total amount of combustible material needed for the clinkering process is controlled in function of the carbon added via filter (37) and the carbon added via discharged hot bed material (11)..

6. A process according to claim 4, wherein the amount of combustion air needed for the clinkering process is controlled in function of the additional carbon separated in the filter (37) and the carbon added via discharged hot bed material (11).

7. A process according to claim 3, wherein part of the calcined pulverized lime escaped from cyclone (8) and separated in filter (37) is re-injected into line 32 upstream the filter (37) to improve sulfur removal efficiency by simultaneously controlling the relative humidity in the flue gas.

8. A process according to claim 1, wherein the calcined raw mix is preheated before entering the clinkering process.

9. A process according to claim 4, wherein the gas and the fly ash escaping the cyclone and entering the steam producer (33) are cooled at a fast rate in order to avoid recarbonation of lime.

10. A process according to claim 1, wherein the exhaust gases from the kiln (16) and the cyclone (53) are added to the gases exhausting the CFB cyclone (8) in order to match pressure conditions.

11. A process according to claim 1, wherein the predominant portion of the sensible heat in the clinker exiting the clinkering process is used for generating steam.

12. A process according to claim 1, wherein part of the flue gas discharged from clinkering process is passed through a scrubber (49), wherein gypsum $CaSO_4$ is produced.

13. A process according to claim 1, wherein the at least one heat exchanger is utilized for preheating air being fed to the bed as fluidizing air and overbed air.

14. A process according to claim 1, wherein the at least one heat exchanger is a steam producer (33) followed by an air heater (28).

15. A process according to claim 1, wherein the part of the cement raw mix fed in pulverized form into the circulating fluidized bed (1) is the predominant part.